Acrylic Microspheres-Based Optosensor for Visual Detection Of Nitrite

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ABSTRACT

A new optosensor for visual quantitation of nitrite (NO_2^-) ion has been fabricated by physically immobilizing Safranine O (SO) reagent onto a self-adhesive poly(n-butyl acrylate) [poly(nBA)] microspheres matrix, which was synthesized via facile microemulsion UV lithography technique. Evaluation and optimization of the optical NO_2^- ion sensor was performed with a fiber optic reflectance spectrophotometer. Scanning electron micrograph showed well-shaped and smooth spherical morphology of the poly(nBA) microspheres with a narrow particles size distribution from 0.6 μm up to 1.8 μm. The uniform size distribution of the acrylic microspheres promoted homogeneity of the immobilized SO reagent molecules on the microspheres' surfaces, thereby enhanced the sensing response reproducibility (<5% RSD) with a linear range obtained from 10 to 100 ppm NO_2^- ion. The micro-sized acrylic immobilization matrix demonstrated no significant barrier for diffusion of reactant and product, and served as a good solid state ion transport medium for reflectometric nitrite determination in food samples.

KEYWORDS: Safranine O; Poly(n-butyl acrylate) microspheres; Nitrite ion; Optosensor; Reflectance spectrophotometer

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